Characterization of six new human embryonic stem cell lines (HSF7, -8, -9, -10, -12, and -13) derived under minimal-animal component conditions.

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Authors: Shawn L Chavez, Juanito J Meneses, Ha Nam Nguyen, Seung K Kim, Renee A Reijo Pera

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Scientific Abstract:
Human embryonic stem cells (hESCs) provide a renewable source of a variety of cell types with the potential for use in both scientific research and clinical cell-based therapy. Several hESC lines have previously been isolated and characterized, however, the majority of these lines were generated in the presence of animal serum and animal-derived feeder cells. Therefore, the exposure of the hESC to animal products may have induced phenotypic and/or genomic changes in the hESC lines not characteristic of normal hESC. Moreover, those hESC lines exposed to animal components may not be used for therapeutic applications due to the risk of graft rejection and pathogenic transmission from animal sources. In this study, we characterized six new hESC lines derived from human blastocysts under minimal-animal component conditions and cultured with human fetal lung fibroblasts. The hESC lines retained the ability to self-renew, are karytopically normal, and express stage-specific embryonic antigen-3 (SSEA-3), SSEA-4, TRA-1-60, and TRA-1-81, but not SSEA-1, markers of pluripotent hESC. In addition, we show that telomerase activity decreased in each of the hESC lines following differentiation into embryoid bodies, albeit to different degrees. Finally, we demonstrate that the hESC lines are capable of differentiating into the three embryonic germ layers in vitro and form complex teratomas in vivo. This suggests that the hESC lines described here are valuable models for both future in vitro and in vivo studies, which may aid in the progression toward clinical-grade cell therapy.